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ABSTRACT

This monograph discusses 12 teaching methods that have a sound theoretical basis, have demonstrated a positive impact on student learning, and have a substantial research base. In many situations, the methods can be combined in such a way that the potential for student learning is greater than if used independently. Since no method will work in every situation for every student, teachers must use professional judgment in matching methods with other variables including students' previous skills and socio-psychological make-up, as well as available resources. In addition to an introduction, a note on multicultural educational suggests that all teaching methods should be implemented in order to complement and support a culturally diverse society. The publication describes the following methods: (1) whole-group instruction; (2) teaching by objectives; (3) adaptive or individualized instruction; (4) mastery learning; (5) cooperative learning; (6) learning styles; (7) direct instruction; (8) discovery method; (9) integrated thematic instruction; (10) peer tutoring; (11) learning by doing; and (12) computer-assisted instruction. (LL)

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What Research Says to the Teacher

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12 Teaching Methods to Enhance Student Learning

by David E. Bartz and Laura K. Miller

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What Research Says to the Teacher

12 Teaching Methods to Enhance Student Learning

by David E. Bartz and Laura K. Miller

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INTRODUCTION

This monograph discusses 12 teaching methods that have a sound theoretical basis and have demonstrated a positive impact on student learning. (See Figure 1.) Teaching methods are the processes or strategies utilized to prompt students to learn. A review of the literature indicates that it is difficult at times to discern the difference between what some sources refer to as teaching methods and what others refer to as teaching techniques (Henson 1980). As used here, "teaching methods" addresses the more general processes of teaching.

Figure 1
Methods Reviewed

Whole-Group Instruction	Direct Instruction
Teaching by Objectives	Discovery (Implicit or Inquiry)
Adaptive or Individualized Instruction	Integrated Thematic Instruction (Thematic Approach)
Mastery Learning	Peer Tutoring
Cooperative Learning	Learning by Doing
Learning Styles	Computer-Assisted Instruction

No one method will work all the time under every circumstance. To be effective, these methods require teachers to determine, the most appropriate methods for a given situation, based on factors such as content and students' needs and interests. Thus there is no one "magical" method (Bartz, Hillman, and DeMont 1988).

While all these teaching methods have a broad base of acceptance, each also has its critics. These methods are often

used in conjunction with each other or a given method may, in part or whole, be incorporated by another method.

Before discussing each teaching method, it is important to understand teacher effectiveness and the role of teaching methods. Teacher effectiveness is a function of the teacher, the students, and the situation. (See Figure 2.) Even though the focus of this monograph is on instructional methods that teachers can use to enhance student learning, it is imperative to realize that students and situational factors also play in what roles student accomplishment in school.

Figure 2
Teacher Effectiveness Model

Teacher Effectiveness	=	Function of Teacher, student(s), and situation
↓		
Measured by goal attainment (validated by student achievement, principal observation, and self-assessment)	Teacher —	(e.g., skills—including teaching methods—traits, and attributes)
	Student(s) —	(e.g., skills, and sociopsychological make-up and nonschool environment)
	Situation —	(e.g., curriculum, resource materials, instructional time available, and principal's support.

Note on Multicultural Education

All teaching methods should be implemented so that they complement and support multicultural education. America is a culturally diverse society and will become more so in the future. In fact, today's white kindergartners are likely to witness the time when they will be a racial minority in the United States. As Hernandez points out, multicultural education is based on the following important assumptions:

a. It is increasingly important for political, social, educational, and economic reasons to recognize that the United States is a culturally diverse society.
b. Multicultural education is for all students.
c. Multicultural education is synonymous with effective teaching.
d. Teaching is a cross-cultural encounter.
e. The educational system has not served all students equally well.
f. Multicultural education is synonymous with educational innovation and reform.
g. Next to parents, teachers are the single most important factor in the lives of children.
h. Classroom interaction between teachers and students constitutes the major part of the educational process for most students. (Hernandez 1989)

TEACHING METHODS

We will discuss each method listed in Figure 1 separately, but it is important to keep in mind that in practice these methods are often combined.

Whole-Group Instruction

During the 1980s renewed attention was given to whole- or total- group instruction. Besides the need to make use of limited resources, a rationale for whole group instruction is that it increases time on task. The problem is that simply increasing time on task does not mean that increased student learning will automatically take place. For example, time on task increases (by definition) when a teacher instructs all 25 eighth graders on the same skill at the same time, as opposed to working in subgroups or individually with the students. However, some of the students may have mathematics skills appropriate for algebra, while others' skills require work in basic arithmetic. Using whole group instruction when the need to learn a given skill does not exist for all students increases time on task, but in all likelihood it has a negative impact on individual learning for many students.

Bloom conducted research that focused on how student learning can be maximized for all students through whole-group instruction. Based on his research, he offers the following suggestions for maximizing the effectiveness of whole-group instruction:

1. Improve the student processing of instruction by using the mastery learning feedback corrective process and/or the enhancement of the initial cognitive prerequisites for sequential courses.

2. Improve the tools of instruction by selecting a curriculum, textbook, or other instructional material that has proven to be very effective.
3. Improve the home environment support of student learning by beginning a dialogue between the school and the home.
4. Improve instruction in the school by providing favorable conditions of learning for all students in each classroom, as well as by increasing the emphasis of higher mental process for all students.

Whole Bloom 1984, group instruction also offers opportunities for at-risk students to receive instruction with their higher-achieving peers. Some practitioners have misinterpreted this to mean that subgrouping and individualization should be abandoned. Ideally, content should be initially presented through whole-group instruction in which the teacher interacts with the total class, followed by practice that may involve small groups, individualization, or peer tutoring (Kindsvatter, Wilen, and Ishler 1988).

Teacher Expectations And Student Achievement (TESA), a program distributed by Phi Delta Kappa (1980), offers the following suggestions for maximizing whole-group instruction from the perspectives of cognitive achievement and social-psychological development:

1. Distributing response opportunities equitably among students.
2. Giving students individual assistance.
3. Providing sufficient time between asking a question and terminating the response opportunity of students (referred to as latency).
4. Delving, rephrasing, or giving students clues.
5. Utilizing questions that require higher-level thinking skills.
6. Providing students with feedback on their responses (referred to as affirmation or correction).
7. Praising desired performance.
8. Extending feedback that explains the reason for praise.
9. Listening effectively.

10. Accepting or clarifying students' feelings.
11. Standing near students when interacting with them.
12. Displaying courtesy.
13. Demonstrating a personal interest and complimenting students with respect to personal happenings.
14. Touching to communicate warmth and understanding.
15. Disciplining students in a positive and humane manner.

Teaching by Objectives

Teaching by objectives is a method often incorporated into other methods (e.g., direct instruction and mastery learning). This method is based on the logic of making clear to the student, as well as the teacher, the exact skills to be learned. It explains why the skills are important, how they relate to other skills, and the general context and purpose of the objectives. These objectives should be clear and understandable to students.

By using the teaching by objectives methods, teachers focus their attention on those most important elements of a lesson or segment of teaching. They also communicate to the student what is to be accomplished. In addition, teaching by objectives furnishes a tangential benefit to teachers; it allows them to assess the relationship between the amount of class time spent and the importance of an objective.

A major benefit of teaching by objectives is that it provides a ready-made basis for evaluating student performance. Teachers can develop test items that are directly linked to an objective, compiling results to determine the degree to which each student has accomplished each objective.

Adaptive or Individualized Instruction

Adaptive or individualized instruction has the advantage of providing effectively for the specific needs of students. Research indicates that adaptive instruction has a strong positive impact on student learning (Waxman, Wang, Anderson, and Walberg 1985). Another advantage of the adaptive method is self-pacing with respect to presenting the content to the learner. This method stresses presenting the curriculum to students in such a way that is challenging, yet attainable, based on their past performances. Because it is called adaptive or individualized instruction does not mean that all instruction has to be one-to-one.

A key component of the adaptive method is conducting a valid assessment of the learner's skills. While a strength of adaptive instruction is the identification of specific objectives for each student, these individual learning objectives should be based on broader curriculum goals. Individually Guided Education, popular during the 1960s and 1970s, is a form of adaptive or individualized instruction.

When utilizing the adaptive method, it is important to examine three general areas pertaining to the student: (a) intellectual abilities and prior achievement, (b) cognitive and learning styles, and (c) motivation and related personality characteristics (Corno and Snow 1986). Factors to consider when using the adaptive method are summarized as follows:

1. Instruction should be based on the assessed abilities of each student.
2. Students should work at their own pace.
3. Students should receive periodic reports on their mastery.
4. Students should plan and evaluate their own learning.
5. Alternative materials and activities should be provided.

6. Students should have a choice of goals and activities.
7. Students should help one another to achieve individual and group goals. (Waxman, Wang, Anderson, and Walberg 1985)

Mastery Learning

Mastery learning is a method that has received notable attention in the past several decades. A comprehensive research synthesis (Guskey and Gates 1986) indicates that mastery learning can have a very positive impact on student learning. While numerous variations of mastery learning exist, the best-known model is that attributed to Benjamin Bloom.

The essence of mastery learning lies in establishing the skills to be mastered or achieved and having an assessment or testing process to determine if students have attained the skills after a segment of instruction (Bloom 1976). If students master the skill, they move to a new skill or set of skills. If they do not master the skill, they are recycled through supplemental instruction and reassessed. Bloom (1984) refers to this as The Feedback-Corrective-Process. The important point is that students do not progress to the next level until they have mastered the previous skill level.

A basic assumption of mastery learning is that virtually all students can learn the basic school curriculum, although it may take some students longer than others. Mastery learning also enhances students' motivation because they experience success. Proponents of mastery learning also hypothesize that underachieving or at-risk students greatly benefit because under the normal competitive evaluative conditions, they have little hope for success. These students are often moved to new skills before they have mastered prerequisites (Stallings and Stipek 1986).

According to Bloom (1984), mastery learning is most effective for content areas that can be sequenced with hierarchical objectives, such as mathematics. Regardless of the content area, the following five-phase approach is helpful to teachers preparing and implementing content for mastery learning:

Phase 1—Break down the content into small units of learning in order for students to be able to learn and be evaluated in each incremental step.

Phase 2—Decisions must be made concerning the use of appropriate instruction to enable students to accomplish the objectives.

Phase 3—Designing and administering formative diagnostic tests which can be scored by students to give them feedback on their progress.

Phase 4—For students who did not achieve mastery, additional materials and/or instruction must be furnished.

Phase 5—Summative testing is given to determine mastery of the unit. Students not mastering the unit are recycled until a mastery level has been achieved. (Kindsvatter, Wilen, and Ishler 1988)

While some practitioners have the perception that mastery learning requires extensive one-to-one instruction, Bloom does not believe this is the case (Brandt 1979). Initially, whole-group instruction can be utilized. Once it is determined through assessment that a student has not mastered a particular skill, however, the student needs to receive supplemental instruction for that particular skill. If other students are also in need of the same instruction, they can be

grouped together; otherwise, one-to-one instruction may be necessary.

Cooperative Learning

During the 1980s, cooperative learning experienced tremendous growth and attention. As the title implies, emphasis is on cooperation between and among students as opposed to competition. Cooperative learning is predicated on developing a learning atmosphere that focuses on group identification and working with peers in a constructive and cooperative manner (Johnson and Johnson 1988). Specifically, cooperative learning is "a set of instructional methods in which students work in small (e.g., four members), mixed ability learning groups" (Slavin 1987, 8). Cooperative learning techniques are beneficial not only for academic skills, but also for social skill development (Johnson and Johnson 1990). The influence of social skills complements and helps shape achievement. Research reviews (e.g., Walberg 1986) indicate that cooperative learning can have a significant impact upon student learning.

Five principles helpful in facilitating effective cooperative learning groups are: (a) distributed or shared leadership; (b) heterogeneous membership; (c) positive interdependency or recognizing and valuing dependence among one another; (d) social skill acquisition or working effectively with others; and (e) group autonomy from the teacher so that it solves its problems in its own ways (Dishon and O'Leary 1984). For cooperative learning groups to be effective, it is important that students develop the motivation to help one another and be provided with ample opportunity to do so. Students

should feel that they are responsible and accountable to the group for doing their best (Deutsch 1990).

For cooperative learning to be successful, students need effective interpersonal skills that facilitate working together. More specifically,

> students must have the prerequisite interpersonal and small group skills and be motivated to use them. These skills should be taught just as systematically as mathematics, social studies, or any subject. Doing so requires that teachers communicate to students the need for social skills, define and model these skills, have students practice them over and over again, process how effectively the students perform the skills, and ensure that students perservere until the skills are fully integrated into their behavioral repertoire. (Johnson and Johnson 1990, 32)

Another factor to remember is that overuse of cooperative learning, as with any teaching method, can lead to boredom for both students and teachers, resulting in a negative impact on learning. If cooperative learning is overused with young children, they may perceive that they cannot engage in "real learning" unless they are doing so with others through a cooperative learning group.

Learning Styles

During the 1980s matching the student's learning style with instructional method gained strong support and was endorsed by professional organizations such as the National Association of Secondary School Principals (Keefe 1987). This method is founded on the assumption that predominant learning styles vary from person to person (Dunn 1990). This means that while one student may learn best through a

particular method of instruction such as discovery, another may learn more effectively through direct instruction.

As Guild indicates, there are three basic ways educators can use learning styles: (a) in focusing on the student knowing himself, (b) in designing curriculum and developing instructional processes that provide for adaptations to the major different learning styles, and (c) in a diagnostic/prescriptive mode (Brandt 1990). Guild advises teachers to utilize several different learning style models if they want to address all three ways. This is an important point because numerous learning styles models are being advocated by professional organizations, companies, and individual experts.

The learning styles approach, which includes a focus on individuals understanding themselves, can help students see new perspectives and enhance their tolerance for differences among one another (Jauven 1990). This can also aid students in their use of a variety of interpersonal skills to work effectively with others who have different styles or preferences. Learning styles can also make students more cognizant of their most effective and efficient means for mastering subject matter.

While proponents of the learning styles approach (e.g. Dunn and Griggs 1988) indicate that a strong research base exists for its positive effects on student learning, other reviewers (Doyle and Rutherford 1984; O'Neil 1990) advise practitioners to proceed with caution. Hunter (1987) also provides a concern for overreliance on having the student's learning style totally drive instruction. She notes that in nonschool environments, students must effectively cope with situations that require a variety of "teaching styles."

Direct Instruction

Direct instruction is a method that many practitioners view as the "basic method" for delivering content, especially at the secondary level. It is also referred to as teacher-directed instruction and explicit teaching, and has a variety of definitions in the literature. For sake of clarity, the description offered by Orlich et al. (1985) is used here. These researchers described direct instruction as consisting of basic convergent patterns that allow the teacher to play a dominant role or to direct the learning activities for all students. For example, when a teacher in a mathematics class instructs all students on the same skill at the same time by putting problems on the chalkboard it is direct instruction. When a foreign language teacher has all students simultaneously pronounce vocabulary words, it is direct instruction. In essence, the teacher actively supplies the stimuli for students, as opposed to students discovering or otherwise providing the stimuli.

Direct instruction is most effective for the teaching of basic literacy and computational skills. More specifically, it is most applicable with content for which the objective is to master a body of knowledge or to learn skills taught in a sequential manner (e.g., mathematical facts, English grammar, and musical notations) (Rosenshine and Stevens 1986). Numerous research studies not only indicate the positive impact that direct instruction has on achievement test results, but also indicate that it is not as effective as nondirected or implicit teaching for outcome variables such as creativity, problem solving, and inquiry (Rosenshine and Stevens 1986; and Peterson 1979).

Six steps of direct instruction developed by Rosenshine are: (a) provide daily review, (b) present new material, (c)

conduct guided practice, (d) provide feedback and correctiveness, (e) assign independent practice, and (f) provide weekly and monthly reviews (Davis and Thomas 1989). Rosenshine also notes that "in practice, teachers must use a lot of art, creativity, and thoughtfulness in order to apply these ideas effectively with different students and different subject areas" (In Davis and Thomas 1989, 134).

One of the most popular teaching methods of the late 1970s and through the mid-1980s was Instructional Theory Into Practice (ITIP) or the "Hunter Model." Hunter's basic premise is that teaching requires a constant flow of decision making. She believes that teaching is based on cause-effect relationships among three categories of decisions that the teacher makes: (a) content decisions, (b) learner behavior decisions (what the student will learn), and (c) teaching behaviors (applying principles of learning). This constant flow of decisions in these three categories is either made by teachers deliberately, intuitively, or by default in that they may be unintentionally delegated to the learner. Hunter's view is that while the major goal of education is for students to be responsible for their own learning, accountability for their learning rests with the teacher (Hunter 1984).

The core of the Hunter Model is the following seven-step plan for designing a lesson: (a) making the anticipatory set (giving the context for what is to be learned); (b) stating the objectives and purpose; (c) providing input in the form of new information; (d) modeling (e.g., using examples); (e) checking for students' understanding; (f) receiving guided practice under direct supervision of the teacher; and (g) doing independent practice. Hunter (1984) stresses that all seven of these factors need not be present or addressed in the previously listed order for a lesson to be effective. For

example, if the intent is for the teacher to have students discover the relationship between variables through inquiry, they may not use the anticipatory set or state the objectives and purpose. Using the seven steps verbatim to develop and deliver a lesson represents direct instruction.

Discovery Method

Another teaching method that continues to have a wide range of appeal is discovery. This method is also referred to as nondirective, inquiry, or the inductive method. The emphasis in recent years on students becoming more self-directed learners has helped rekindle interest in this strategy. The discovery method often structures the learning environment so that through experiences students begin to put together the relationship between variables; in this way "they discover" how all the factors relate for a given concept. The discovery method may also emphasize a divergent thinking approach (Joyce, Showers, and Rolheiser-Bennett 1987). Of major importance in the present scientific literacy movement to improve mathematics and science skills of U.S. students is the use of the discovery method, in conjunction with "learning by doing" approaches, to provide students with hands-on activities. Use of the discovery method helps students develop process skills, which are the skills needed to actually "do" or be involved in science.

The three basic approaches to the inquiry method are rationale, discovery, and experimental. The rationale approach directly involves the teacher through assisting students in identifying generalizations and relationships

between factors, whereas the discovery approach leaves students totally on their own by offering no guidelines or assistance. In the experimental approach the teacher makes a statement that is assumed to be true and the students then finding a way to test it. The 13 elements of the inquiry (discovery) process are: observing, classifying, using numbers, measuring, using space-time relationships, predicting, conferring, defining operationally, formulating hypotheses, interpreting data, controlling variables, experimenting, and communicating (Orlich et al. 1985).

While the present emphasis on the discovery method is often found is in mathematics and science, it can be used in any subject area. Regardless of the academic area, it is important to understand that the discovery method does not consist of simply asking questions. Rather, it represents a process of conducting a thorough investigation to arrive at conclusions.

Integrated Thematic Instruction

Integrated Thematic Instruction (ITI)—commonly referred to as the thematic approach—is based on interfacing how students learn, instructional methods and strategies, and the curriculum. It relies heavily on the brain research of Hart (1983) in the context of how students learn. Key factors for effectively implementing the thematic approach are: (a) creating a trusting environment, (b) developing content meaningful to students (c) providing activities from which students can choose, (d) allowing adequate time for understanding, (e) enriching the environment through a variety of real-life experiences, (f) nurturing students, and

(g) creating a classroom environment free of physical and emotional threat (Kovalik 1986).

An important aspect of the thematic approach is that teachers develop or modify curriculum as it relates to their classrooms. This is often done on an interdisciplinary basis, although it can be applied to a single discipline. Teachers select a year-long theme (e.g., Around The World In Eighty Days) that is used as a focal point or anchor for teaching skills. The thematic approach holds that this makes the curriculum more relevant to students, resulting in greater understanding and ownership of what they are to learn. The thematic approach combines a variety of teaching methods and strategies such as cooperative learning, direct instruction, visual learning, discovery, effective classroom management, and Bloom's Taxonomy of Cognitive Objectives (Kovalik 1986).

Implementing the thematic approach requires considerable time and effort on the part of teachers, especially for designing and modifying curriculum. This intense involvement often leads to strong support and commitment. A major concern of the thematic approach is the degree to which essential skills in the curriculum can be efficiently and effectively integrated into the yearly theme.

Peer Tutoring

Peer tutoring is a method that can be used to supplement classroom instruction during the regular school day or it can be offered as a special after-school program. From a cost-effective perspective, it yields greater achievement gains per dollar than any method (Jenkins and Jenkins 1987).

Peer tutoring is especially useful for students who need intense practice on specific skills. It is often integrated or used in conjunction with other methods such as cooperative learning.

For after-school peer tutoring programs, tutors must receive formal training. Key factors in the effectiveness of after-school tutors are time commitment, punctuality and dependability, confidentiality, and a positive regard for the students being tutored. After-school programs require active supervision by a staff member who can ensure that the tutor is addressing the specific skills needed by the student, monitor progress, and interface activities with the classroom teacher (Jenkins and Jenkins 1987).

An advantage of peer tutoring is that peers can often translate the skills being taught into "the language of the learner" and inspire the tutee to become actively involved in learning (Hedin 1987). Research indicates that peer tutors often do more than merely regurgitate what has been said by the teacher. They use examples that are identifiable and useful to the tutee (Cazden 1986). Peer tutors can also identify "mechanical" problems impeding the tutee, such as not understanding directions or the object or purpose of a lesson.

Learning By Doing

"Learning by doing" is a teaching method that utilizes practices such as simulation, role play, gaming, case study, manipulatives, and experiments. It focuses on making learning less abstract by actually having the learner perform a task and acquire the skills as she/he experiences the task. Research indicates that learning by doing activities are most

effective when complementing, as opposed to replacing, other methods (Cruickshank and Telfer 1980). They are especially useful for teaching affective skills (e.g., understanding the feelings of discrimination or identifying values) (Magney 1989). Learning by doing activities are also advantageous from the perspective of motivating and enhancing students' interests in the subject matter.

Simulations attempt to replicate the essential characteristics of the actual setting in which the skills being taught would be utilized (e.g., simulations used to teach driver education). A major purpose of simulations is to reproduce the behavioral processes needed to perform in the actual "real-world" setting. Simulations are often used in conjunction with computer-assisted instruction. For example, computer programs can simulate rocket launchings, the conducting of experiments, and decision making in social science areas.

A role play has students behaviorally demonstrate what they would do in a given role or situation under specific circumstances and prompts them to analyze the attitudes underlying their behavior. Role plays are most effective when addressing interpersonal or social skills. The willingness of students to "get into" the assigned role is key to meaningful learning taking place. Feedback from other students and the teacher as critiques is useful, as is audiovisual taping of role plays. Finally, role reversal within a role play (e.g., a white student in the role of an African-American student and vice versa) leads students to recognize personal bias.

The case method enables students to solve problems and make decisions based on actual happenings. Students are presented with written information describing an event or

situation. Then they diagnose the problem and solve it by indicating what action to take, working independently or in subgroups. The teacher should summarize the case study through whole-group instruction, bringing out points that did not result from the individual or subgroup analysis. There are often several plausible courses of action for case studies.

Games are a type of role play structured so that students play by responding to contrived situations. They are often competitive in that students play against or compare their score to a norm. Games motivate students by providing immediate feedback of results and prompting students to be active learners.

Manipulatives in the form of base 10 blocks, unifix cubes, and fraction blocks represent an approach to teaching mathematics popular with the present scientific literacy movement. In the area of science, kits that allow students to experiment have proven to be very effective in reducing the abstractness of concepts. Experiments, which have been used for generations, are still an effective means of learning by doing.

Computer-Assisted Instruction

The microcomputer's use during the 1980s and into the 1990s has continued to increase, with computer-assisted instruction being used for drill and practice in basic skills, teaching writing skills, simulations for science technology, drafting, job costing and project planning in vocational courses, and higher-order thinking skills (Roland 1990; and McCorduck and Russell 1986). Good software that is pedagogically sound and complements other instruction is

key to the effective use of computer-assisted instruction. It is also important for software to be user friendly and reliable.

A major advantage of computer-assisted instruction is its "patience," consistency, and ability to motivate students (as long as it is not overused). It allows for individualization, complements students' being independent learners, and represents an instructional emphasis of the 1990s—process-oriented learning that requires active participation of students.

Swick offers the following guidance for utilizing computer- assisted instruction: (a) it should enable the student to be in control; (b) it should promote the interactive involvement of the student; (c) it should stimulate cognitive and social learning activities; and (d) it should be related to other learning experiences in the classroom (1989, 12). A basic question that teachers should ask themselves when contemplating the use of computer-assisted instruction is "How can computers enhance what I am already doing in the classroom each day?" (Brooks 1990). Teachers should also consider how the use of computer-assisted instruction will fit into their overall instructional plan that it complements—rather than conflicts with—other teaching methods.

TIME ON LEARNING

Another concept, which some may not view as a method, time on learning is presented here because of the powerful impact it can have on student learning. It is important to note that the emphasis is on "time on learning" as opposed to time on task (Hunter 1987). When students simply spend time on a task, there is no assurance that learning is taking place or that instruction is being delivered at a meaningful level. Students could spend endless hours on a task, but if the task were out of their realm of capability, the time would be wasted. The key, then, is to apply time on learning in such a way that instruction delivered is appropriate to the specific needs of each learner (Fisher, Marliave, and Filby 1979). This does not mean that instruction must be one-to-one. In many situations students can be grouped together based on common needs.

The key to maximizing time on learning is academic learning time. Academic learning time is composed of allocated time, student engaged time, and the student success rate. Allocated time is simply the amount of time scheduled for an activity (e.g., 50 minutes for reading). Student engaged time is the actual time a student is involved in working at a task. For example, a student may be meaningfully engaged with a task for only 30 of the 50 minutes allocated for reading. In sum, "engaged" means the time during which the student is actually paying attention. Student success rate refers to how effectively the student is performing during the engaged time. For example, a student's learning may be effective or "successful" for only 15 of the 30 minutes of engaged time. When allocated time, student engaged time, and student success (learning) occur

simultaneously, academic learning time is occuring (Arends 1988).

Essential to effectively applying time on learning is proper diagnosis, prescription, presentation of information, and student activities for practice and reinforcement. During the learning activity the teacher must monitor student performance by checking for understanding in order to receive feedback on the success rate (Arends 1988).

SUMMARY

The teaching methods reviewed here have strong potential for enhancing student learning. All the methods have a substantial research base, yet each has its critics. In many situations, the methods can be combined in such a way that the potential for student learning is greater than if used independently. Because no method will work in every situation for each student, teachers must use their professional judgment in matching methods with numerous other variables such as students' needs and available resources. Finally, while knowledge and effective implementation of these methods can have a positive impact on learning, other factors, such as students' previous skills and socio-psychological make-up and available resources, will also affect learning.

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